

# ENGINEERING REPORT

2003–2007 Ford 6.0L Powerstroke Transmission Cooler | SKU: MMTC-F2D-03

By Steve Wiley, *Mishimoto Engineer*

## REPORT AT A GLANCE

- **Goal:** Create a transmission cooler that outperforms the stock option. The Mishimoto cooler should fit directly into the 6.0L Powerstroke without any cutting or modification required.
- **Results:** The Mishimoto transmission cooler showed average temperature drops of 12°F when compared to the Ford towing package transmission cooler. This temperature reduction came with less than 0.5 psi of pressure loss when compared to stock.
- **Conclusion:** The Mishimoto transmission cooler is a valuable upgrade for any 6.0 owners who tow or carry large payloads and want to extend the life of their transmissions.

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## DESIGN OBJECTIVES

The design requirements assigned to this project are as follows:

- Create a transmission cooler that reduces fluid temperatures when compared with the Ford towing package cooler
- Must be a direct fit with no cutting or permanent modification necessary
- Mishimoto cooler must not show a significant pressure loss when compared to the stock cooler

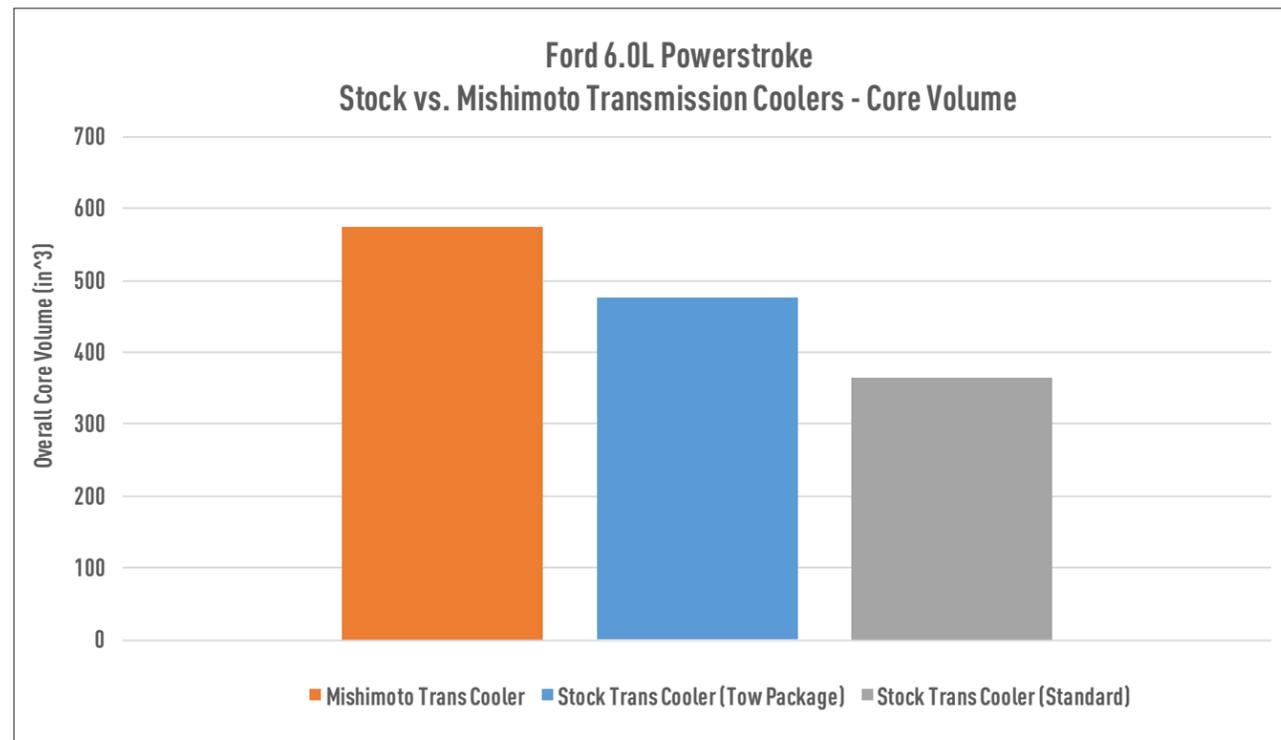
## DESIGN AND FITMENTS

We began the R&D process by evaluating both the standard and towing package Ford transmission coolers to find potential room for improvement. The standard cooler is a 26-row design and is

relatively large for a stock transmission heat exchanger. The towing package is a Ford upgrade that increases the number of rows to 31. The Mishimoto transmission cooler was designed to be close to the same height as the 31-row cooler so as not to hinder additional airflow to the intercooler. The added core volume is attained by extending the core's width. This design makes the Mishimoto cooler 58% larger than the standard Ford cooler and 21% larger than the towing package cooler. Figure 1 below shows a comparison of all three core volumes.

More information on the R&D process for the transmission cooler can be found on the Mishimoto engineering blog:

[MISHIMOTO ENGINEERING BLOG](#)



**FIGURE 1:** The Mishimoto transmission cooler is 21% larger than the stock towing package cooler and 58% larger than the standard cooler. This is achieved without adding additional restriction of airflow to the intercooler.

## PERFORMANCE TESTING

A 2005 Ford F-250 Powerstroke was used to test each transmission cooler setup. The ambient temperature on the day of testing was approximately 60°F (15.5°C) with 20% humidity. To test the performance of the cooler, a Dynapack™ dynamometer was used to apply a constant load to the truck.



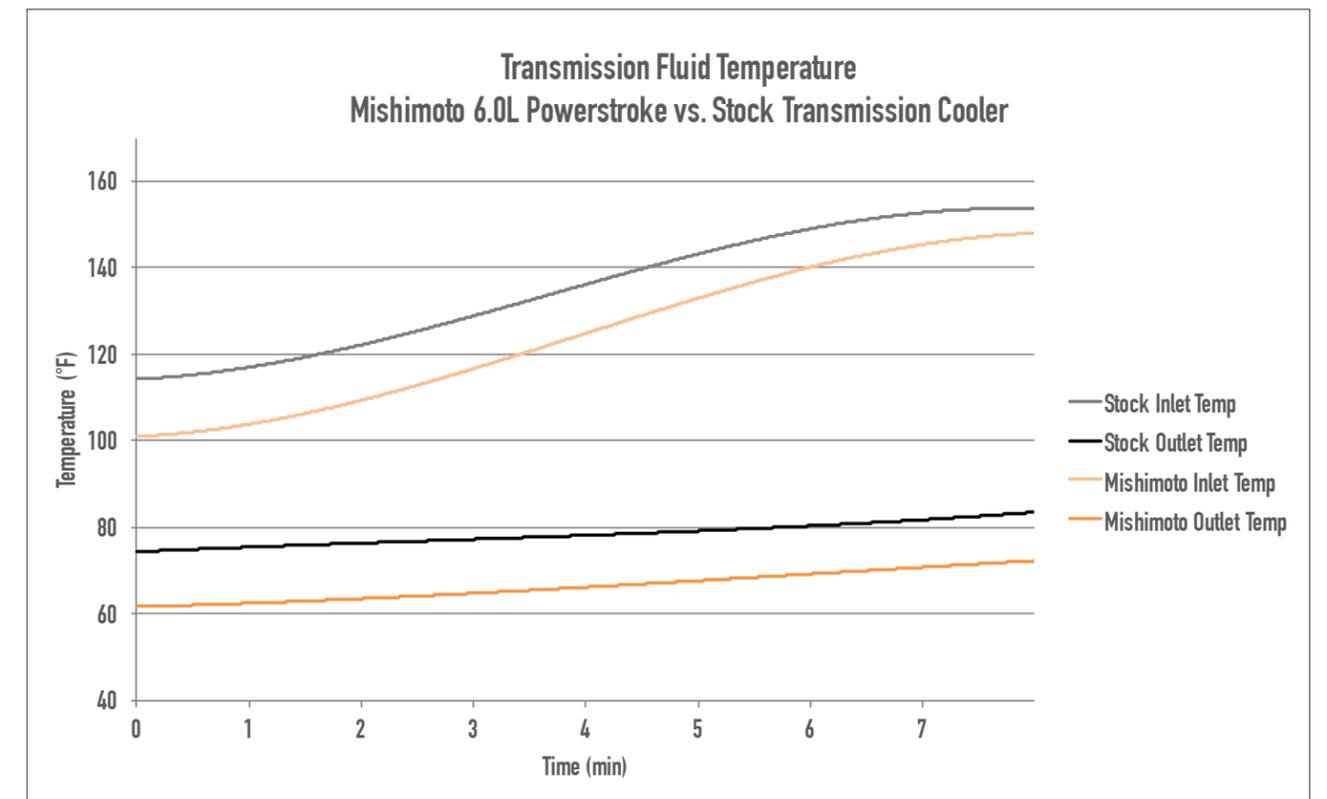
**FIGURE 2:** A Dynapack dynamometer was used for vehicle testing.

Before each test was conducted, the truck was allowed to cool for two hours, and fluid temperature was cooled back to ambient. The truck was then started and idled for 10 minutes to allow all fluids to warm up. The truck was run in overdrive at 60 mph and generated approximately 600 ft-lb of torque throughout the pull. As shown in Figure 3, the temperature of the transmission fluid gradually climbed throughout each test.

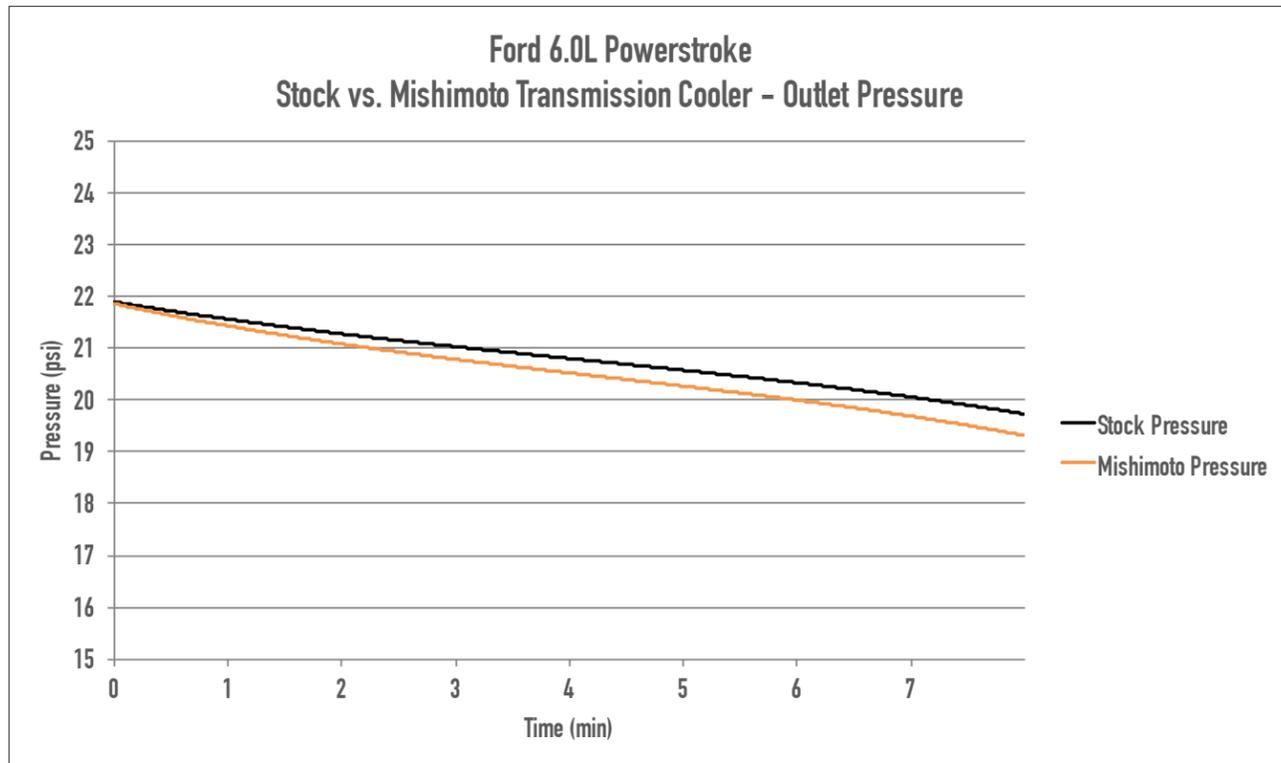
**The Mishimoto transmission cooler kept the fluid an average of 12°F lower than the stock cooler, even as the inlet temperatures begin to converge at the end of the test.**

This increase in heat rejection can be attributed overall to the increase in core size.

Along with temperatures, system pressure was monitored to ensure that the outlet fluid pressure of the Mishimoto cooler did not significantly decrease. A sharp decrease in outlet pressure could lead to premature transmission failure.



**FIGURE 3:** The Mishimoto transmission cooler kept temperatures 10–12°F lower than the stock towing package cooler.



**FIGURE 4:** The Mishimoto transmission cooler shows a difference of less than 0.5 psi when comparing outlet pressures. This is well within an acceptable range.

As seen in Figure 4, the Mishimoto transmission cooler follows the outlet pressure curve to within 0.5 psi of the stock cooler. This is well within an acceptable range and will not cause damage to the transmission.

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